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The new Construction Products Regulation (CPR) and the shift towards eco-efficient construction

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Abstract

On March 9th the European Union approved the Regulation (EU) 305/2011 related to the Construction Products Regulation (CPR) that will replace the current Directive 89/106/CEE already amended by Directive 1993/68/EEC known as the Construction Products Directive (CPD) beyond July 2013. The objective of the CPR is the same as the CPD, namely to "*achieve the proper functioning of the internal market for construction products by means of harmonised technical specifications*". This paper analyses the main differences between CPD and CPR. This paper also addresses the new basic requirement of CPR "Sustainable use of natural resources" and the subject of hazardous substances in construction products.

Key Words: Construction Products Regulation; Construction Products Directive; hazardous substances; REACH Regulation, eco-efficient construction products

Introduction

The CPD (1) has been enforced in the EU area since 1989 but only in 2001 was published the the first harmonised product standard. Currently over 400 harmonised product standards have been published which cover almost 85% of the construction products. The CPD aimed to "*remove technical barriers to trade in the field of construction products in order to enhance their free movement in the internal market. In order to achieve that objective…* (the CPD*) provided for the establishment of harmonised standards for construction products and provided for the granting of European technical approvals*".

The new CPR (2) has been approved on March 9th and published in the *Official Journal of the European Union*-OJEU by April 4th. According to this regulation the replacement of the CDP was needed "*in order to simplify and clarify the existing framework, and improve the transparency and the effectiveness of the existing measures*". Being a Regulation this means that "*shall have general application. It shall be binding in its entirety and directly applicable in all Member States*" while the CPD, was "*binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods*" (3).

According to the Article 68 the CPR shall enter into force on the 20th day following its publication in the OJEU (April 24th). This includes the Article 1 and Article 2, Articles 29 to 35, Articles 39 to 55, Article 64, Article 67, Article 68 and the Annexe IV. However, Articles 3 to 28, Articles 36 to 38, Articles 56 to 63, Articles 65 and 66, as well as Annexes I, II, III and V shall apply from 1 July 2013. This means that only by 1 July 2013 will the CPR will be fully enforced without the requirement for any national legislation. This also means that UK, Ireland and Sweden will then lose their "opt-out" clause employed under the CPD period.The RPC establishes some transitional provisions (Article 66) namely the fact that "*Construction products which have been placed on the market in accordance with Directive 89/106/EEC before 1 July 2013 shall be deemed to comply with this Regulation*".

CPD versus CPR: Main differences.

Although CPD and CPR share the same goal they present relevant differences between them. The first one relates to its content. Table 2 compares the content of the CPD and the CPR, showing that the new regulation is more detailed:

Table 1- CPD versus CPR: Document content

Content	CPD	CPR
Pages	20	39
Articles	24	68
Annexes	4	5

The CPR index is as follows:

Ch. I – General provisions
Ch. II – Declaration of performance and CE marking
Ch. III – Obligations of economic operators
Ch. IV – Harmonised technical specifications
Ch. V – Technical assessment bodies
Ch. VI –Simplified procedures
Ch. VII – Notifying authorities and notified bodies
Ch. VIII – Market surveillance and safeguard procedures
Ch. IX – Final provisions
Annex I – Basic requirements for construction works
Annex II – Procedures for adopting a European assessment document
Annex III – Declaration of performance
Annex IV – Product areas and requirements for TABS
Annex V – Assessment and verification of constancy of performance

According to the Annex I the basic requirements for construction works are as follows:

1-Mechanical resistance and stability
2-Safety in case of fire
3-Hygiene, health and the environment
4-Safety and accessibility in use
5-Protection against noise
6-Energy economy and heat retention
7-Sustainable use of natural resources

When comparing the basic requirements of the two regulations one can see that CPR has a new requirement (nº 7) and also that nº3 and nº 4 have been refined. This means that a new and more environmental-friendly approach will determine the manufacture of construction products.

Another difference between the CPD and CPR is that while the former demanded a declaration of conformity that document will be replaced by a declaration of performance (DoP) issued by the manufacturer (Article nº 4 and Annexe III). The products in that condition will carry the CE marking. The CPR allows for some exceptions in the use of the DoP (Article 5) such as the case of "*a manufacturer…placing a construction product covered by a harmonized product standard on the market where:*

a) the construction product is individually manufactured or custom-made in non-series; process in response to a specific order and installed by a manufacturer;
b) the construction product is manufactured on the construction site;
c) the construction product is manufactured in a traditional manner or in a manner appropriate" to heritage conservation as part of a designated environment or because of their architectural or historic merit"

Table 2 shows the Product areas according to the Annex IV – Product areas and requirements for TABS.

Table 2- Product areas

Area code	Product area
1	Precast normal/lightweight/autoclaved aerated concrete products
2	Doors, windows, shutters, gates and related building hardware
3	Membranes, including liquid applied and kits (for water and/or water vapour control).
4	Thermal insulation products. Composite insulating kits/systems.
5	Structural bearings. Pins for structural joints.
6	Chimneys, flues and specific products.
7	Gypsum products.
8	Geotextiles, geomembranes, and related products.
9	Curtain walling/cladding/structural sealant glazing
10	Fixed fire fighting equipment (fire alarm/detection, fixed firefighting, fire and smoke control and explosion suppression product).
11	Sanitary appliances.
12	Circulation fixtures: road equipment.
13	Structural timber products/elements and ancillaries
14	Wood based panels and elements
15	Cement, building limes and other hydraulic binders.
16	Reinforcing and prestressing steel for concrete (and ancillaries). Post tensioning kits.
17	Masonry and related products. Masonry units, mortars, and ancillaries.
18	Waste water engineering products.
19	Floorings.
20	Structural metallic products and ancillaries.
21	Internal & external wall and ceiling finishes. Internal partition kits.
22	Roof coverings, roof lights, roof windows, and ancillary products. Roof kits.
23	Road construction products
24	Aggregates.
25	Construction adhesives.
26	Products related to concrete, mortar and grout.
27	Space heating appliances.
28	Pipes-tanks and ancillaries not in contact with water intended for human consumption.
29	Construction products in contact with water intended for human consumption
30	Flat glass, profiled glass and glass block products.
31	Power, control and communication cables
32	Sealants for joints.
33	Fixings.
34	Building kits, units, and prefabricated elements
35	Fire stopping, fire sealing and fire protective products. Fire retardant products.

A crucial aspect of the new regulation relates to the information regarding hazardous substances. While the CPD only considered a very limited range of dangerous substances, eg formaldehyde and pentachlorophenol the CPR links this subject to the Regulation (EC) No 1907/2006 (Registration, Evaluation, Authorisation and Restriction of Chemicals - REACH Regulation).

The introduction of the CPR states that "*Where applicable, the declaration of performance should be accompanied by information on the content of hazardous substances in the construction product in order to improve the possibilities for sustainable construction and to facilitate the development of environment-friendly products*". It also states that "*the specific need for information on the content of hazardous substances in construction products should be further investigated*". Besides the Article 67 mention that "*By 25 April 2014, the Commission shall assess the specific need for information on the content of hazardous substances in construction products and consider the possible extension of the information obligation provided for in Article 6(5) to other substances*".

Investigations about hazardous substances on construction products are scarce, because its a scientific area located in the crossroad between Civil Engineering and Medicine. The author is the main Editor of the book "Toxicity of building materials" that will be published in the first

semester of 2012 by Woodhead Publishing. This book is composed of 16 chapters with invited authors from 12 countries as follows:

Ch.1 – Introduction (Portugal)
Ch.2 - The main health hazards from building materials (Croatia)
Ch.3 - Plastic materials: PVC (Turkey and USA)
Ch.4 – Plastic materials: CPE, CPVC, CSPE, CR (Turkey)
Ch.5 - Materials responsible for formaldehyde and VOC emissions (China)
Ch.6 - Semi-volatile organic compounds: phthalates, PFCs, flame retardants (USA)
Ch.7 – Wood preservatives (Portugal)
Ch.8 - Mineral fibre-based building materials and their health hazards (Italy)
Ch.9 - Radioactive materials (Israel)
Ch.10 - Materials that release toxic fumes during fire (Canada and Iran)
Ch.11 - Heavy metals: lead (UK)
Ch.12 - Other heavy metals: mercury, cadmium, chromium and antimony (Nigeria)
Ch.13 - Materials prone to mould growth (Italy)
Ch.14 – Antimicrobials (USA)
Ch.15 - Potential hazards from waste based/recycled building materials (France)
Ch.16 - Toxicity of nanoparticles (Canada)

The outcome of this book will help to bridge the two aforementioned areas.

Comments on the "sustainable" concerns under the CPR

The new basic requirement of CPR defined as "Sustainable use of natural resources" represents a positive step towards a more holistic construction industry. Nevertheless, the term "sustainable" may be misplaced because if we look to the ecologic footprint, the concept developed by Rees and Wackernagel (4) to measure the world biocapacity, we realize that we are already living beyond the Earth's biocapacity (Fig. 1).

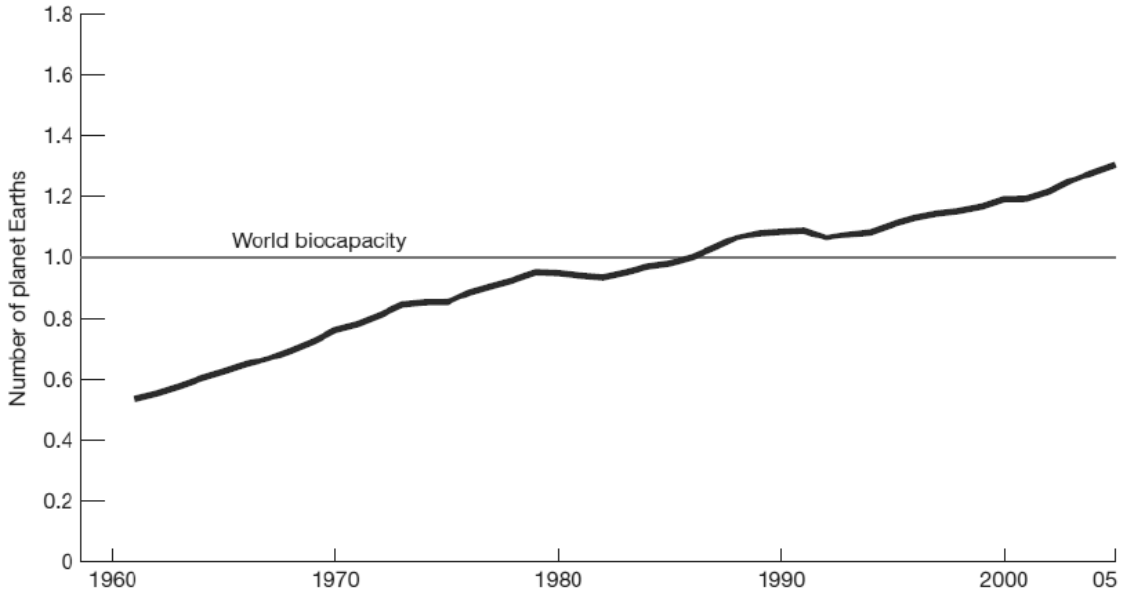

Figure 1.4 - Global ecological footprint, 1961–2005 (5)

To make things worse the construction pace will keep on rising especially on Asia. For instance China will need 40 billion square meters of combined residential and commercial floor space over the next 20 years—equivalent to adding one New York every two years or the area of Switzerland (6). So it would be more realistic that the CPR used the term "*eco-efficient*", a concept introduced in 1991 by the World Business Council for Sustainable

Development-WBCSD (7) that includes ''*the development of products and services at competitive prices that meet the needs of humankind with quality of life, while progressively reducing their environmental impact and consumption of raw materials throughout their life cycle, to a level compatible with the capacity of the planet*''. In this way is possible to see problem in all its magnitude and act accordingly.

As a result of the "sustainable" concerns of the CPR the future choice of construction products will be based on its LCA. Unfortunately since almost construction products are not environmental friendly this is the same as choosing between the less of two evils. Another drawback of LCA is the fact that it does not take into account the possible and future environmental disasters associated with the extraction of raw materials.This means that for instance the LCA of the aluminum produced by the Magyar Aluminium factory, the one responsible in October 2010 for the sludge flood in the town of Kolontar in Hungary, should account for this environmental disaster. Similar considerations can be made about the construction products that were processed or transported using oil extracted from the Deepwater Horizon well in the Gulf of Mexico. Only then construction products will be associated with their true environmental impact (8).

The CPR can have "sustainable" concerns, but the bottom line, however, is that new and more environmental friendly construction products are needed. The author thinks that the only way to rapidly achieve truly eco-efficient construction products encompasses the replication of natural systems. The continuum improvement of these systems carried out over millions of years lead to materials and "technologies" with exceptional performance and fully bio-degradable. This is in fact one of the most promising areas in the field of nanotechnology.

Of course investigators are still trying to grasp the astonishing complexities, but a lot has already been done in the field of eco-efficient construction. The author is the main Editor of the book "*Nanotechnology in eco-efficient construction: Materials, processes and applications*" that will be published in the first quarter of 2013 by Woodhead Publishing. This book is composed of 15 chapters with invited authors from 10 countries as follows:

Ch.1 – Introduction (Portugal)
Ch.2 - Photocatalytic based materials: Concrete, mortars and plasters (Italy)
Ch.3 - Photocatalytic based materials: Paints (China)
Ch.4 – Photocatalytic based materials: Tiles and glasses (China)
Ch.5 - Nanoengineered concrete (Greece)
Ch.6 - Nanocomposite steel (USA)
Ch.7 – Nanoclay modified asphalt mixtures (Iran)
Ch.8 - Design process for nanomaterials (India)
Ch.9 - Manufacturing of thin films and nanostructured coatings for eco-friendly constructions (Sweden)
Ch.10 - Safety issues related to nanomaterials (USA)
Ch.11 - Smart structures (USA)
Ch.12 - High performance thermal insulators (Belgium)
Ch.13 - Nanogel windows (Italy)
Ch.14 – Nanotechnology for domestic water purification (India)
Ch.15 - Materials incorporating third generation photovoltaic cells (Arab Emirates)

Conclusions

This paper highlighted the differences between the CPD and the CPR. The latter is more detailed and also has a broader range covering "sustainable" issues and also hazard substances on construction products. The new regulation constitutes a positive step towards a more holistic construction industry. Nevertheless, investigations about more environmental friendly construction products are needed.

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